

EXHIBIT 4

UNITED STATES DISTRICT COURT
EASTERN DISTRICT OF MICHIGAN
SOUTHERN DIVISION

In re Flint Water Cases

Civil Action No. 5:16-cv-10444-JEL-
MKM (consolidated)

Hon. Judith E. Levy
Mag. Mona K. Majzoub

Elnora Carthan, et al. v. Governor
Rick Snyder et al.

Civil Action No. 5:16-cv-10444-JEL-
MKM

REBUTTAL DECLARATION OF CLIFFORD P. WEISEL, M.S., Ph.D.

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I. INTRODUCTION

I, Clifford P. Weisel, M.S., Ph.D., submit this Rebuttal Declaration in support of class plaintiffs' response to defendant VNA's opposition to class plaintiffs' motion for class certification ("VNA's Opposition") ECF No. 1369. I also submit this Rebuttal Declaration in opposition to defendant VNA's motion to exclude my Declaration and testimony ("VNA's Motion to Exclude") ECF No. 1384.

In my initial Declaration that was submitted in support of class plaintiffs' motion for certification of a subclass of minor children, ECF No. 1208-136, PageID.37892-3, I presented four primary opinions:

Opinion 1: that children and pregnant women who consumed unfiltered tap water over a period of at least 90 days in Flint at homes, schools or daycare establishments that meet Criteria 4, 5 and 6 in Dr. Hu's Declaration between May 1, 2014 and January 5, 2016 ingested increased concentrations of lead as a result of Flint's change in water to the Flint River.

Opinion 2: that the failure to use appropriate corrosion control treatment when the water source for Flint was switched on April 25, 2014 caused a disruption of the protective layer on the surface of pipes and plumbing fittings and fixtures resulting in soluble and particulate lead in the tap water in residences, day care centers and schools.

Opinion 3: that homes, day care centers, and schools that had lead service lines, galvanized steel service lines with connectors containing lead, or interior plumbing that had lead solder or other lead containing fittings and fixtures (i.e. structures built prior to 1986 that did not have complete plumbing upgrades) would have increased lead in their tap water because of the corrosivity of the water resulting from the change of water source on April 25, 2014.

Opinion 4: that water lead levels were elevated in Flint between May 1, 2014 and January 5, 2016 in homes, day care centers, and schools if they had service lines or interior plumbing whose properties make them a likely source of lead. Further, that opinion would be true even if a single or small number of water samples collected in those buildings measured below the lead minimum reporting limit since water lead levels vary with time and depend upon the sampling conditions used.

Nothing presented in VNA's Opposition or its Motion to Exclude has caused me to revise these fundamental opinions and, as further outlined below, some of the materials presented by VNA lend further support to the opinions I originally presented.

II. MY BACKGROUND IN THE FIELD OF EXPOSURE SCIENCE IS RELEVANT TO THE OPINIONS PRESENTED IN MY DECLARATION.

In my initial Declaration, I explained that I am a professor and scientist, with an expertise in exposure science. I have published over 100 papers in the field of

exposure science including papers on the body burden levels of residents following ingestion of a contaminant in a community water supply, exposure of residents from ingestion of contaminants from residential tap water, exposure to contaminants from showering with residential tap water, and the exposure to lead in dust to toddlers and its effect on their blood lead levels,¹ among others.²

VNA objects to my forming the expert opinions I presented because I teach “exposure science-the study of the effects of toxic agents on living organisms”. However, VNA’s statement is an incorrect characterization of exposure science. Their statement ‘the study of the effects of toxic agents on living organism’³ describes the science of toxicology. Exposure scientists identify the nature and extent of contact with environmental contaminants over space and time. I applied the basic scientific principles of exposure science to determine whether minors who lived in or attended school/day care in Flint were exposed to additional lead from their tap water during 2014 through 2016 because of the changes made to the water supply in Flint in 2014 and, if so, what would cause them to have contact with higher water lead levels leading to increased lead exposure. I conducted that assessment by

¹ *Weisel Declaration*, ECF No. 1208-136, PageID.37925-33.

² I have also served as a Peer Reviewer for the EPA on its *Guidelines for Human Exposure Assessment*. See *supra*, note 2, page xiii.

³ *Motion to Exclude*, ECF No. 1384, PageID.52504.

drawing on my greater than 30 years of experience conducting research in and teaching doctoral students studying exposure science. When conducting exposure assessments, I follow generally acceptable scientific approaches to determine the concentration of contaminants in the exposure media, and how and when people contact those environmental contaminants based on available scientific literature and data, my knowledge of basic scientific principles, and/or direct measurements or mathematical models. The concepts I deploy for determining exposures to populations and individuals have been outlined in peer-reviewed scientific literature, textbooks and governmental documents, such as in the text book I coauthored with Dr. Paul Liroy in 2014 “Exposure Science: Basic Principles and Applications”, that has recently been translated into Chinese for training their scientists in this field; in the National Academy of Sciences (NAS) book: Exposure Science in the 21st Century, A Vision and a Strategy published in 2012; and in multiple US Environmental Protection Agency documents on how to conduct exposure assessments.

The NAS book (2012) states:

“Exposure science is defined by this committee as the collection and analysis of quantitative and qualitative information needed to understand the nature of contact between receptors (such as people or ecosystems) and physical, chemical, or biologic stressors. Exposure science strives to create a narrative that captures the spatial and temporal dimensions of exposure events with respect to acute and long-term effects on human populations and ecosystems.”

I took this approach in forming my opinions in this case.

VNA's Motion to Exclude challenges my qualifications⁴ to provide the opinion (Opinion #2) that the failure to use appropriate corrosion control disrupted the protective layer on the surface of pipes and plumbing fittings and fixtures, resulting in soluble and particulate lead in the tap water in residences, day care centers and schools. I noted⁵ that, in addition to the academic literature on this issue, I relied upon the Expert Declaration of Dr. Larry Russell.

I also reviewed and relied upon the deposition testimony of Michael Schock, a chemist in the U.S. Environmental Protection Agency's National Risk Management Research Laboratory. Mr. Schock issued a report based on water sampling he conducted in Flint and testified that Flint was experiencing "high lead results," (p. 49, line 13); had no "corrosion control treatment," (p. 73, line 17-18); that as of September of 2015 "there was a lot of lead release" (p. 99, line 5-10); that "the condition they had really needed to be changed rapidly, that it was a corrosive water," (p. 125, line 16-20); that there was a "widespread corrosion problem," (p. 324, line 19); and "there was a pretty big lead problem" (p. 324, line 24).⁶

⁴ ECF No. 1384, PageID.52513.

⁵ ECF No. 1208-136, PageID.37898.

⁶ *Weisel Declaration. Exhibit 2, List of References*, ECF No. 1208-136, PageID.31698-31701; *In re: Flint Water Cases*, Case 5:16-cv-10444-JEL-MKM, *Deposition of Michael R. Schock*, Vol. I (May 5, 2020), and Vol. II (May 6, 2020).

Since issuing my initial declaration, I have reviewed VNA's Opposition, which provides additional support for my opinion. In VNA's Opposition⁷, they state:

“[T]he principal cause of the problems with Flint water was that the City failed to address corrosion concerns associated with the switch to the Flint River. During the years of using Detroit water, the metal in service lines or interior pipes made of iron or lead had reacted with the chemicals in that water to form a protective scale on the inside of the pipes. Ex. 34, Duquette Report 8. The City did not assess how the scale would fare when exposed to water from the Flint River, which has a different chemistry than Detroit water. *Id.* at 8-9. When the City started using Flint River water, the outer layers of the scale started to break down, and pieces of the scale (which included particles of lead and iron) entered the water supply. *Id.*”

I agree completely with VNA's statement as set forth above.

VNA's Motion to Exclude also states that I cannot say what an appropriate corrosion-control treatment would be (ECF No. 1384). The only aspect of corrosion-control treatment that is relevant to my opinion is that the City of Flint's failure to implement such treatment caused lead to enter the water supply, which is a point upon which VNA and I agree.

VNA also questions my qualifications to provide an opinion that certain structures in Flint (homes, schools and daycare centers) had elevated water lead levels.⁸ I respond to that position in Section III.

⁷ ECF No. 1369, PageID.45455-6.

⁸ ECF No. 1384, PageID 52515.

III. HOMES BUILT ON OR BEFORE 1986 WERE HIGHLY LIKELY TO EXPOSE THEIR OCCUPANTS TO ELEVATED LEAD LEVELS FROM CORROSIVE WATER.

VNA seeks to exclude my opinion that homes built prior to 1986 will have sources of lead that will expose the residents to elevated levels of lead when corrosive water conditions are present. To be precise, my opinion is “that homes, day care centers, and schools that had lead service lines, galvanized steel service lines with connectors containing lead, or interior plumbing that had lead solder or other lead containing fittings and fixtures (i.e. structures built prior to 1986 that did not have complete plumbing upgrades) would have increased lead in their tap water because of the corrosivity of the water resulting from the change of water source on April 25, 2014,” (Opinion #3).

Homes that have a source of lead content in their interior plumbing, which is common to homes constructed prior to 1986, will leach lead when improperly treated corrosive water is present. This can be a significant source of lead exposure. Dr. Larry Russell reported that “lead-soldered copper pipes gave off 19 times the amount of lead with the Flint River water over DWSD water,” (ECF No. 1208-67, PageID.35475).

Even where a house does not have lead or galvanized service lines, interior plumbing can be a significant source of lead. Marc Edwards reported, for example, that class representative Elnora Carthan’s home (which he reports as resident X) did

not have lead or galvanized service lines. Nonetheless, Ms. Carthan's home had the highest level of lead, 1051 µg/L, of any home tested in Virginia Tech's sampling of Flint homes in August 2015.⁹

VNA represents that the water lead levels for a majority of homes serviced with copper service lines that were sampled by Virginia Tech in August 2015 had no detectable levels of lead.¹⁰ This is incorrect. *Every* home in Flint sampled in the August 2015 testing performed by Virginia Tech, including every home with a copper service line, had detectable levels of lead.^{11, 12}

⁹ Roy and Edwards, Environmental Science Water Research & Technology, 2020 at 3027. See also, ECF No. 1208-129. Ex. 115, VATECH_00212274.

¹⁰ VNA states as follows: "Moreover, Dr. Finley's review of the data revealed that 'the majority of samples collected from homes with copper service lines in August 2015 had non-detectable WLLs [water lead levels].'" VNA Motion to Exclude Dr. Weisel, ECF No. 1384, PageID.52524. VNA makes a similar false representation in the Motion to Exclude Dr. Hu's Expert Report. "Importantly, 'the majority of samples collected from homes with copper service lines in August 2015 had non-detectable [water lead levels].'" VNA Motion to Exclude Dr. Hu, ECF No. 1376, PageID.48778

¹¹ As testified to by Dr. Marc Edwards in his deposition, the detection limit for lead in the August 2015 Virginia Tech samples was .1µg/L, (or .1 parts per billion), or less. Deposition of Dr. Marc Edwards, p.636:

Q. The detection limits for the analysis that were performed on the water that was collected in that August sampling event, do you know what the detection limits were?

A. For lead it was probably .1 ppb or less.

¹² Notably, the only homes which did not register a detectable level of lead in the August 2015 sampling performed by Virginia Tech were homes located outside of the City of Flint, which continued to receive DWSD water. See, ECF no. 1208-94,

VNA makes reference to one home (the home of class representative Rhonda Kelso) to challenge my findings that all homes constructed prior to 1986 would likely have elevated levels of lead because Ms. Kelso replaced her plumbing in 2000.¹³ Again, to be precise, my opinion was that all homes “that had lead service lines, galvanized steel service lines with connectors containing lead, or interior plumbing that had lead solder or other lead containing fittings and fixtures (i.e. structures built prior to 1986 that did not have complete plumbing upgrades)” would have an increased level of lead as a result of the corrosive Flint Water. (Opinion #3) Even if Ms. Kelso had a complete plumbing upgrade that removed all interior lead, she would still have elevated levels of lead because she was serviced by a lead service line. In fact, Ms. Kelso’s elevated lead levels were confirmed in the August 2015 Virginia Tech Sampling, which detected 66.2 parts per billion¹⁴ of lead at her home.¹⁵

PageID36086. “After removal of the homes located outside of Flint, all homes measured during the 2015 sampling period in Flint had at least one water sample with lead level above the instrumental detection limit of 0.1 µg/L”

¹³ ECF No. 1384, PageID 52519.

¹⁴ See also, ECF No. 1208-129, Ex. 115, VATECH_00212274, 2015 tab.

¹⁵ It would be a simple matter in an affidavit process to inquire whether a home occupant had a complete plumbing upgrade. If a home had been replumbed before the class period, such a home could be cross-referenced against updated Flint records on lead and galvanized service line location to determine whether the home would be exposed to elevated lead by virtue of their use of a lead or galvanized service line. In any event, the only home that VNA has identified for suggested exclusion from the class is Ms. Kelso’s, which as noted above, should not be excluded. It was serviced by a lead service line and had elevated levels of lead, as documented in

There are a plethora of published, peer-reviewed scientific and medical articles pertaining to the Flint Water Crisis which I reviewed and cited in my initial report.¹⁶ This extensive literature, in addition to the Virginia Tech 2015 sampling data produced in this case, provides a sufficient basis of facts and data to support my opinion. Numerous scientific articles concur with my opinion. They demonstrate a general scientific consensus that the City of Flint: (a) switched to water from the Flint River which was corrosive; (b) discontinued corrosion control; (c) experienced corrosion of Flint's water distribution system, service lines, and residential pipes; (d) experienced elevated water lead levels (WLLs) in the drinking water throughout the city; and as a result (e) exposed its residents to lead-contaminated water.¹⁷ Professor Marc Edwards, for example, in his articles on the Flint Water Crisis, concluded that "[t]he Flint River was a more corrosive and unstable water source, which did not have either optimized corrosion control or added orthophosphate corrosion inhibitors," that "there was a system-wide lead in water contamination

Virginia Tech sampling. Dr. Goovaerts' rebuttal declaration confirms that Ms. Kelso's home was served by a lead service line during the class period.

¹⁶ECF No. 1208-136, PageID.37944-47.

¹⁷ See e.g., Masten, S., et al., *Flint Water Crisis, What Happened and Why?*, Journal AWWA, 108:12, 22-42, at p. 22, 33 (December 2016) (concluding that "elevated levels of lead found in the drinking water of residences in Flint had a profound effect . . ." and Flint's "failure to recognize the corrosivity of the water and to add a corrosion inhibitor had devastating effects."). See also, Pieper, K., et al., *Evaluating Water Lead Levels During the Flint Water Crisis*, Environ. Sci. Technol, 52, 8124-8132, at p. 8124-8125 (2018).

problem,” *and* “[t]he incidence of elevated WLLs [water lead levels] was evident throughout the city.”¹⁸

IV. MY OPINION THAT WATER LEAD LEVELS IN FLINT TAP WATER WERE ELEVATED DURING THE CLASS PERIOD IS FURTHER SUPPORTED BY THE STUDIES VNA RELIES UPON TO CHALLENGE MY FINDINGS.

VNA also challenges my opinions that water lead levels were lower in Flint before the change to the Flint River, claiming that I used “cherry-picked data” by citing to Flint’s Lead and Copper Monitoring program reporting from 2008 and 2011. Defendant’s expert contends that I should have also cited a novel water lead level estimation technique that estimates water lead levels based upon sewage sludge.

First, I should point out that with the exception of Flint’s lead and copper reports from 2008 and 2011, there are no data which measured lead levels in Flint water taken from the taps of Flint homes prior to the switch to the Flint River.¹⁹ In

¹⁸ Pieper, K., et al., *Evaluating Water Lead Levels During the Flint Water Crisis*, Environ. Sci. Technol, 52, 8124-8132, at p. 8125-8126 (2018). See also Roy, S., et al., *Lead release to potable water during the Flint, MI water crisis as revealed by routine biosolids monitoring data*, Water Research, 160; 475-483 (2019) (“our Virginia Tech research team exposed citywide water lead contamination,” and our sampling “reflects citywide release of lead to water from plumbing, p. 478.)

¹⁹ Numerous sources have been critical of Flint’s Lead and Copper Reporting in 2014-15. It is not clear, however, whether such criticism also applies to the earlier water reporting conducted by Flint in 2008 and 2011.

other words, the lead and copper monitoring data produced by the City of Flint is the only data available that actually measured the levels of lead from the taps of Flint homes. Thus, I did not cherry pick which measured concentrations I used in my report for that time period. The 2008 and 2011 lead and copper data indicate that none of the pre-switch water sampled in homes in those years demonstrated a reportable level of lead ($>2\mu\text{g/L}$).

In further review of the validity of that data, we have checked local jurisdictions surrounding Flint whose water is also distributed from the City of Flint and supplied by the Detroit Water and Sewerage Department. The 2011 water lead level data from these surrounding jurisdictions, also supplied by Detroit through Flint, are similar to the testing conducted in Flint. These 19 jurisdictions had no exceedances of the 15 ppb threshold and an apparent 90th percentile level of only one ppb.²⁰

I also reviewed Flint's 2008 and 2011 data to determine whether there were specific homes for which we could confirm the existence of a lead service line. Dr. Goovaerts' Rebuttal Declaration lists the homes for which a lead service line was

²⁰ See Genesee County Drain Commissioner 2011 Consumer Confidence Report. The Consumer Confidence Report lists a 90th percentile amount of ".001 ppb." This is likely an error as most detection methods do not detect at that level. I have referenced the result above as an "apparent" level of 1 part per billion, which is what I believe was intended in the County's Consumer Report as 1 part per billion is equal to .001 $\mu\text{g/L}$.

confirmed in Flint's database. None of these homes measured a lead level above the detection level of $2\mu\text{g/L}$ in 2008 and 2011.

Moreover, the Roy, Tang and Edwards paper upon which Defendants suggest I rely, estimates the WLL90 or the average of the 90th percentile of water lead levels of the 1st, 2nd and 3rd draw samples and therefore should not be combined with the WLL from the LCR rule as they are looking at a different sets of water samples. The WLL90 does not estimate the increase in lead exposure from water for the majority of the minors in Flint but rather reflects the WLL in the homes with the highest lead levels. Further, that paper does not confirm the safety of Flint's water in 2015. To the contrary, the paper reinforces the view that "Virginia Tech's citywide sampling event in August 2015, did detect a very significant lead contamination problem..."²¹ They indicated that "the proportion of Flint children with elevated blood lead levels $\geq 5\text{ }\mu\text{g/dL}$ (%EBL5) roughly doubled during the FWC (April 2014–October 2015), especially in the neighborhoods where Virginia Tech's water sampling revealed greatest lead in water risk". FWC refers to that time period which they call the Flint Water Crisis, as the switchback of the water was made in October 2015, but as they note "the official lead in water data started meeting federal standards in late 2016". This delay is because it took months for a new steady state to be established for lead

²¹ Roy, Tang and Edwards. (2019) Lead release to potable water during the Flint, Michigan crisis as revealed by routine biosolids monitoring data. *Water Research* 160: 475-83 at 480.

between the affected service lines/residential plumbing and the water delivered to the tap. In that respect, it remains clear that people who ingested Flint Water through January 5, 2016 remained exposed to water with elevated lead levels.

V. WATER LEAD LEVELS IN FLINT REMAINED ELEVATED BEYOND JANUARY 5, 2016.

In the Motion to Exclude it is stated “Dr. Weisel ignored findings in Dr. Edwards’ study that water lead levels returned to pre-switch levels by August 2014.” I did not ignore that. Rather, that is not what that study showed, nor does it agree with statements Dr. Edwards made in numerous places. Instead, he has said the opposite both in the paper describing that study and in his deposition. As quoted in the previous section from the paper he co-authored with Roy and Tang it is stated “the official lead in water data started meeting federal standards in late 2016”. In Dr. Edwards’ deposition, when Dr. Edwards was asked “you felt sometime between May and June of 2016 that the water was relatively safe” he responded “2017, some years after” and when asked again “2016” he responded “No. I don’t think I said – I mean, relatively – maybe with a filter. Maybe for bathing. I don’t think I said that for lead.” (page 482 Lines 4 – 13). Later in his deposition he states, in response to a question about the water, if orthophosphates had been added when the water was switched, “the water quality would have gone down, but it wouldn’t have reached the sort of catastrophic levels of problems that were observed in 2014, 2015”, again

stating that the water problems exist in 2015. (Page 194 line 9-12). The data collected in 2015 and 2016 reported by MDEQ (2018) and Pieper et al. (2018) support my conclusions regarding exposure to elevated levels of lead. As summarized in Roy, Tang and Edwards 2019 paper on biosolids, the study it was suggested I ignored, “WLLs remained above federal standards through June 2016 as indicated by both the State of Michigan official data on residential/sentinel sampling and Virginia Tech's citizen science water lead monitoring,” again saying that lead was elevated in the water system through that time period. One of the conclusions from that study was that “Summer spikes of WLL occurred when orthophosphate was not added to water in 2014 and 2015, but not in pre-FWC or post-FWC summer months when orthophosphate was being dosed.”

As I stated in my Declaration on pages 24-25, the sampling of homes throughout Flint in 2015 and 2016 showed that “All homes measured during the 2015 sampling period in Flint had at least one sample with detectable lead above the 0.1 µg/L the instrumentational detection limit” and “lead remained in drinking water in a subset of the homes through November 2016”. The reason for using an end date of January 5, 2016 for considering lead exposure through drinking water was not because lead was no longer elevated. Rather, people would likely have stopped using it for drinking and cooking based on new governmental advisories. Thus, to determine if and when minors living in Flint had an increased lead exposure due to

the change in the water source and treatment, I used the fundamental principles of exposure science to examine both if and when the contaminant lead was higher in the tap water and if and when there was contact with, i.e. consumption of, that water.

VI. CONCLUSION

After reviewing the issues raised, I still hold the same opinions presented in my original Declaration.

These opinions are based on my expertise as an exposure scientist to examine the potential for a population to contact contaminants in environmental media. In this current case, I reviewed the many published scientific studies, declarations made by experts in the fields of water chemistry and corrosion of water distribution systems, and reports of water lead levels made in Flint and the surrounding communities to determine that the water lead levels were elevated in homes, schools, and day care settings whose service lines or interior plumbing would be expected to be a source of lead leaching into the water due to the change in corrosivity of the water following the switch to Flint River water without implementing the appropriate corrosion control treatment. Further, the measurements, published papers and statements made in depositions as part of this case support my opinion that elevated water lead levels would be present at least through January 5, 2016.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and recollection.

Executed on: March 23, 2021

By:



Clifford P. Weisel, M.S., Ph.D.